



北京凯硕恒盛科技有限公司

Beijing Kai Shuo Heng Sheng Technology Co., Ltd

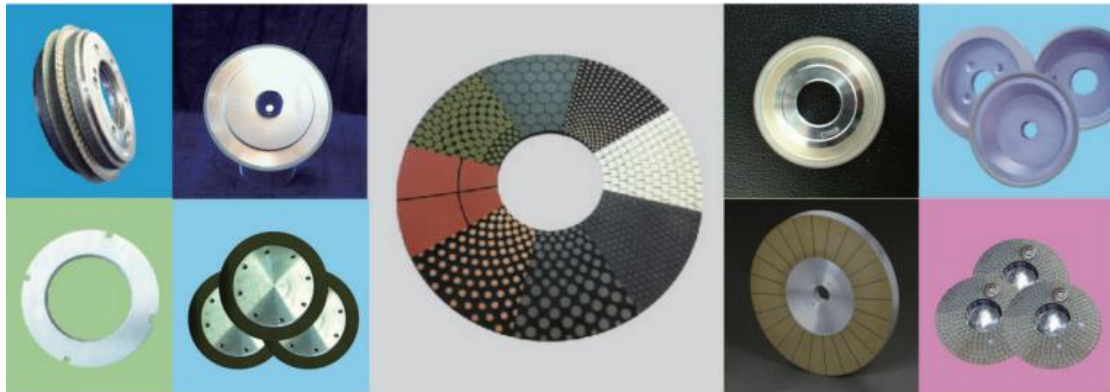
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## KSHS Grinding Wheels & Lapping plates



### Company profile

Beijing Kai Shuo Heng Sheng Technology Co., Ltd. (KSHS), with factory locating in Tianjin, mainly produces and sells super-hard materials such as diamond grinding wheels, CBN grinding wheels and diamond slurry.

They are widely used.

Grinding materials are: powder metallurgy, magnetic materials, sapphire, silicon, cemented carbide, stainless steel, cast iron, ceramics, plastics, and so on.

Grinding workpieces are: rotor, stator, blade, impeller, bearing, valve plate, slider, valve core, gasket, tool & cutter, piston, nozzle, etc.

We cooperate with foreign excellent grinding wheel factories, configures advanced equipment, and selects high-quality materials to provide you most suitable products.

### Content

1. General knowledge of super-hard materials
2. Super-hard material grinding wheel marking method



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3. Vitrified bond grinding wheels
4. Resin bond grinding wheels
5. Electroplated grinding wheels
6. Double lapping grinding wheels
7. Back grinding wheels
8. Cutting wheels
9. Diamond dressing tools
10. Diamond slurry

## 1. General knowledge of super-hard materials

Super-hard materials include synthetic diamond and Cubic Boron Nitride. Their common characteristics are high hardness, good thermal conductivity and sharp edges, but having separate characteristics too.

**Diamond** has poor stability; at high temperatures, it will diffuse into iron, chromium, vanadium, tungsten, molybdenum, titanium and other metals to form carbides, which will accelerate abrasive grains wear.

Therefore, it is not suitable to grind steel and iron metals, but it can grind various alloy cast irons because carbon in cast iron has been saturated and no longer has a diffusion problem.

Suitable for grinding hard and brittle materials such as hard alloys, ceramics, optical glass, agate, semiconductor materials, stone and other non-metallic materials and non-ferrous metals.

**Cubic boron nitride (CBN)** is mainly used for processing high-strength, high-hardness ferrous materials such as tool steel, die steel, stainless steel, heat-resistant steel, high vanadium steel, and quenched steel.

CBN grinding wheels are not easy to grind hard alloys and non-metallic hard materials. They will decompose in alkaline solution at 300 °C and can be micro



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decomposed in boiling water. Please pay special attention when using them.

## Bonds and their codes

Types	Characteristics
Resin bond: B	Good self-sharpness, not easy to block and has elasticity. Good polishing performance, poor bonding strength and wear resistance, difficult to combine coarser abrasive grains, not suitable for heavy load grinding.
Vitrified bond: V	Higher wear resistance than resin bond; not easy to heat and block; small thermal expansion; easy dressing
Metal bond: M	High strength, good shape retention, long service life and heavy load; poor self-sharpness, easy to block and heat, not suitable to combine fine-grained abrasives, difficult trimming.
Electroplated	High grinding strength; surface abrasive has high grain size and uniformly exposed on the surface, so has sharp cutting edge and high processing efficiency. Because of thinner coating, service life is short.

## 2. Super hard material grinding wheel marking method:

Shape	Outer diameter D	Thickness T	Inner hole H	Abrasive layer width W	Abrasive layer thickness X	Abrasive type	Grit	Bond	Concentration
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Example:

1A1	160	20	2	5	6	D	320	V	100
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Grinding wheel shapes: flat shape(1), dish shape(12), cup shape(6), bowl shape (11), etc.

Abrasive types; diamond and CBN

Bond: resin(R), vitrified/ceramic (V), metal (M), etc.

Concentration: usually divided into 50,75, 100, 125, etc.

## Relationship between super hard material particle size/grit and machined surface roughness:



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grinding tools grit	Processing surface roughness Ra (um)	
	Resin bond	Vitrified bond
80/100—100/120 —	0	.32—2.5
100/120—170/200 0	.16—0.63 0	.16—1.25
170/200—270/325 0	.08—0.32 0	.16—0.63
325/400—M10/20	0.04—0.16 —	
M8/12—M4/8 0	.02—0.08 —	
M4/8—M1.5/3	0.01—0.04 —	
Grinding process	Suitable grit ranges	
Coarse grinding	80/100—120/140	
Middle fine grinding	120/140—200/230	
Fine grinding	200/230—M36/54	
Grinding, polishing	M22/36—M0.5/1.5	

### 3. Vitrified/ceramic bond grinding wheels:

#### Features:

- 1) High strength, good heat resistance
- 2) Sharp cutting, high grinding efficiency
- 3) Not easy to heat and clog up, small thermal expansion, easy to control processing accuracy while grinding.
- 4) Strong grinding force, easy dressing, long life

Vitrified/ceramic bond super hard grinding wheels are widely used in automotive parts, bearings, semiconductors, ceramics, metals and other fields.





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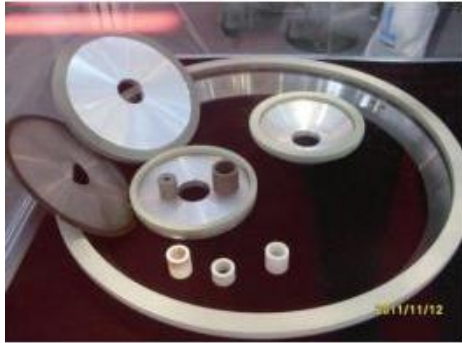
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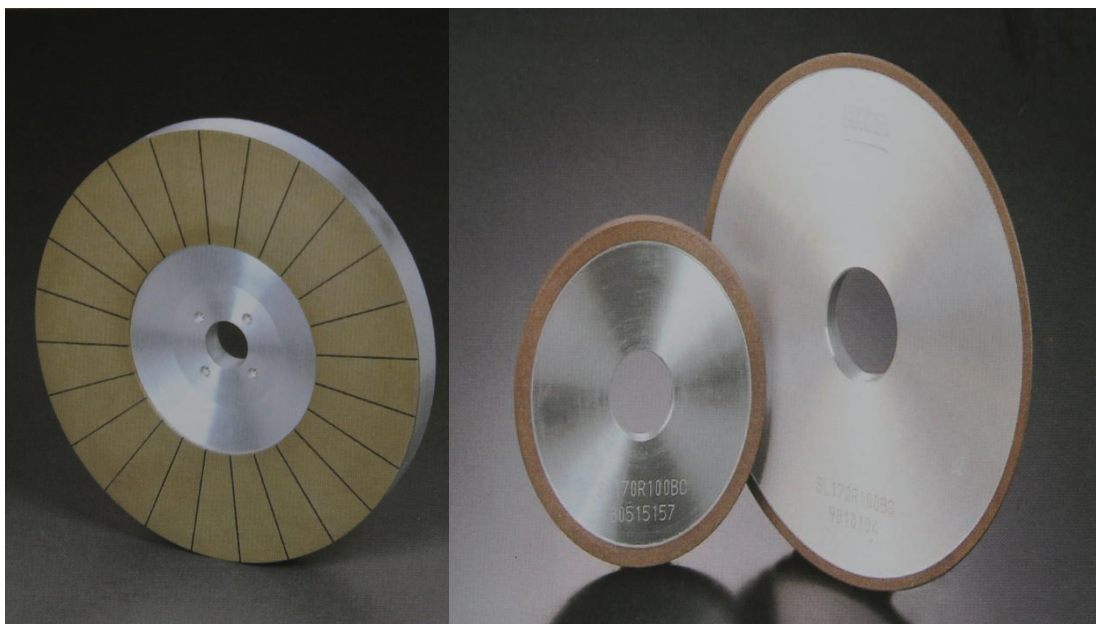


## 4. Resin bond grinding wheels

Resin bonded superhard grinding wheel is one of the most widely used super-hard tools.

It uses benzoic acid and polyamide or other resin as binder, to form a tool by gluing diamond or CBN micropowder with an inorganic filler. It is characterized by sharpness, small cutting force, easy dressing and high efficiency. Effectively used for surface grinding, centerless grinding, slotting and internal grinding.

It is the ideal grinding tool for stainless steel, ceramics, glass, high speed steel, alloy tools and many other new super-hard materials.





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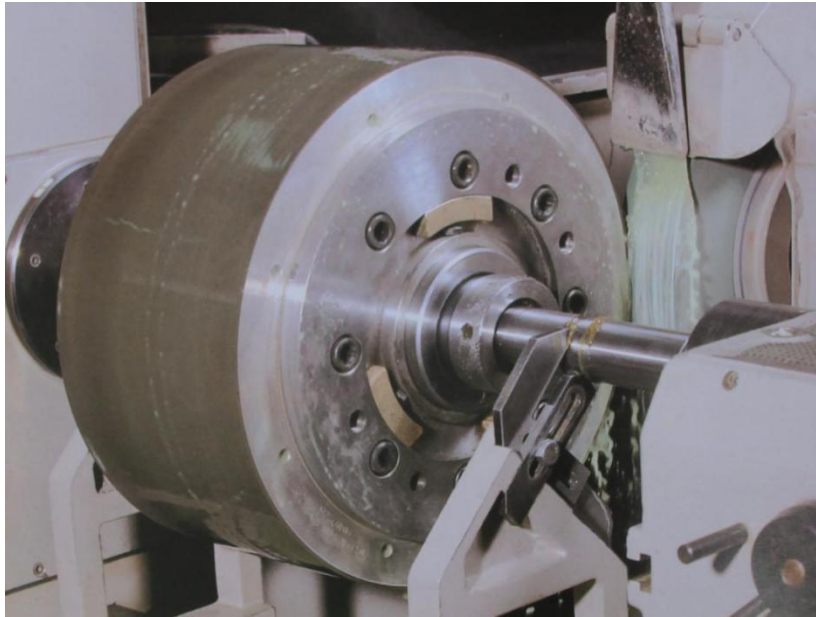
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## 5. Electroplated grinding wheels

Electroplated grinding wheels are made of single or multiple layers of diamond/CBN powders bonded to steel substrates through nickel-based binders.

### It has the following characteristics:

- 1) Abrasive concentration is high, and having most abrasives participate in grinding at the same time, so high efficiency .
- 2) Working face can be made into various high precision and complex shapes, very suitable for forming grinding.
- 3) No dressing needed in wheel effective life.
- 4) Electroplated grinding wheels can be re-plated many times. By chemically releasing worn abrasive, the matrix geometry accuracy is checked for re-machining. Therefore, the re-plated grinding wheel is almost equivalent to a new grinding wheel, but the cost is much lower.

Our products can be widely used in sapphire, glass, optical lens, magnetic materials, ceramics, cemented carbide and other industries.



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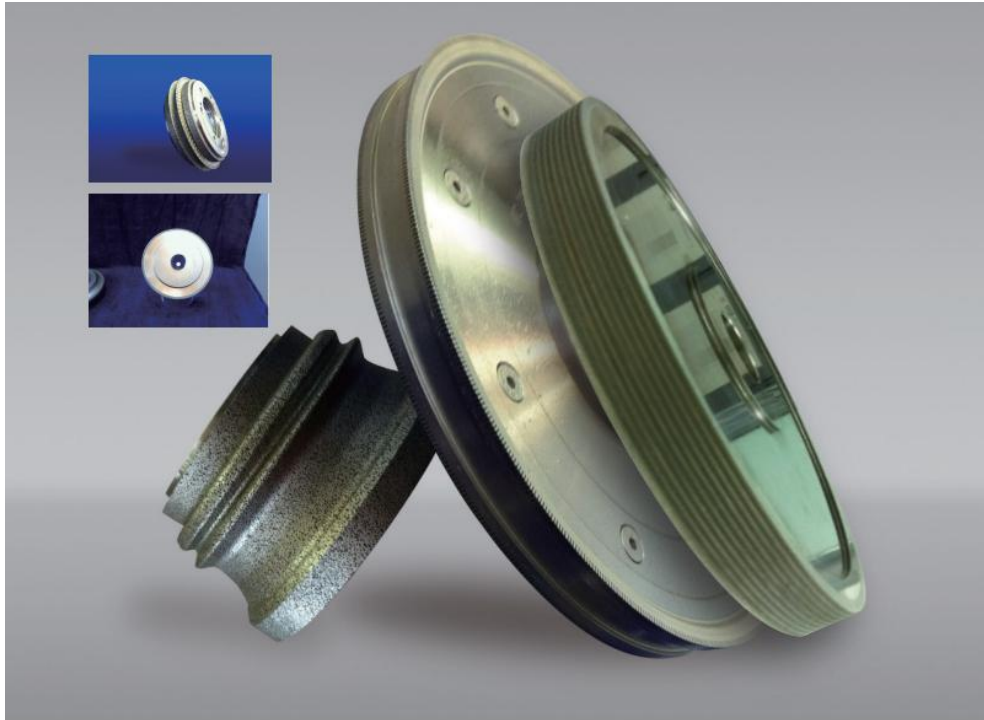
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## 6. Double lapping plates/double side grinding wheels

Plane surface grinding wheel mainly includes resin bond and ceramic bond grinding wheels, which can be used on single-side grinding and double-side grinding equipment at home and abroad.

Different surface grinding wheels are chosen according to customer's workpiece and equipment.

Our grinding wheels have been widely used in automotive parts, air conditioners, refrigerator compressors, hydraulic components, seals, bearings and other industries. Main processing materials are: magnetic materials, powder metallurgy, cemented carbide, steel, ceramics, etc.

Depending on workpiece material, surface roughness after processing can reach Ra 0.05-0.2um and parallelism  $\leq 1\mu\text{m}$ .



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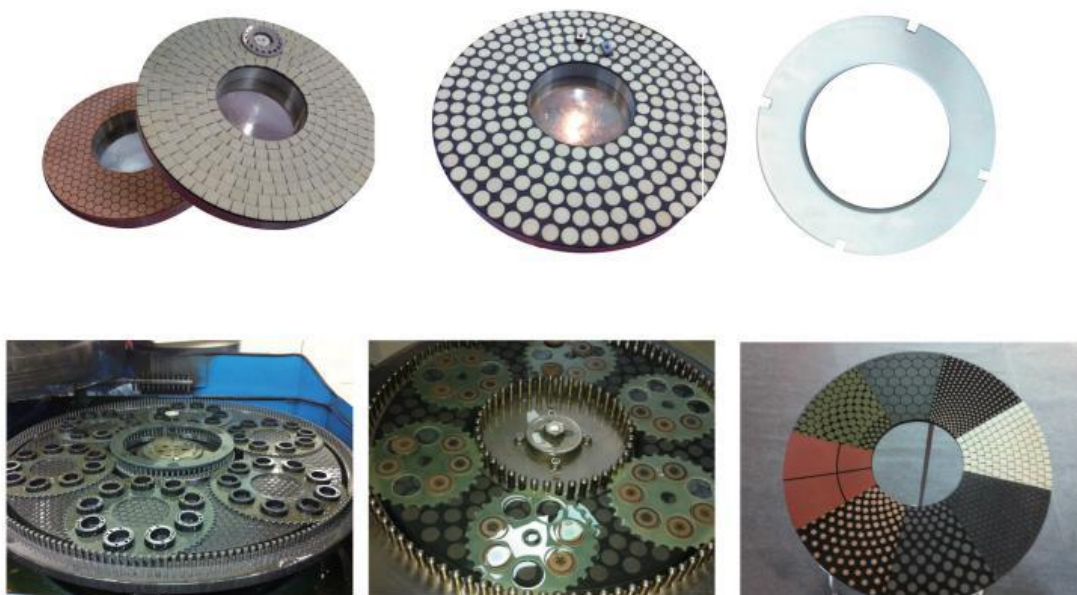
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## 7. Back grinding wheels/Thinning wheels

Wafer thickness is thinned by back grinding, which makes the wafer have excellent surface roughness and size consistency, improves chip heat dissipation effect. Thinning to a certain thickness is conducive to the later packaging process.

It is mainly used in LED industries like sapphire epitaxy wafer, silicon wafer, gallium arsenide, indium phosphide, silicon carbide, ceramics and other materials.

Our thin grinding wheel is widely used in Japanese, Korean and other equipments. It has excellent grinding performance and high cost performance.

Application Procedures: back thinning; Front surfaces' rough and fine Grinding.





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## 8. Cutting wheels

In the past two decades, the world's electronics and semiconductor industry has reached an unimaginable height through rapid development, and will continue to develop to a higher level at a faster rate.

In these industries, silicon wafers and Sapphire Wafers need higher quality super-hard tools to produce products with very high precision. We sell such high-precision tools such as micro-variable blades, wafer back (surface) thinning grinding wheels, edge grinding wheels, wafer slicing wheels and so on.

We ensure that every product can meet your requirements.



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## 9. Diamond dressing tools

When grinding wheel surface is excessively worn and lose grinding ability the grinding wheel needs dressing/trimming. Trimmings remove unnecessary residue (such as metal debris) on grinding wheel surface, or a small amount of bonding material and display abrasive material for effective grinding processing.

In general, trimmers can be divided into four types:

### 1) Single point diamond dresser:

High quality single crystal diamond and metal matrix are sintered on steel handle. Diamond setting point is concentric with handle.

### 2) Multi-point diamond dresser:

By sintering two or more diamonds with the same metal matrix, multi-point diamond



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can be used to grind larger and wider wheels. Because of multiple points, it can disperse resistance force, reduce friction heat, extend tool life, reduce the likelihood of early failures, and achieve fast sanding.

### 3) Forming diamond dresser:

High quality single crystal diamond is sintered with a metal matrix on the steel handle and grinded into various shapes, such as conical points with a certain diameter range, side bodies, polyhedrons, etc.

### 4) Hybrid diamond dresser:

High quality diamond particle mixture is sintered with a metal matrix. This extends tool life and is economical.





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## 10. Diamond slurry

Diamond slurry is a liquid with grinding action; it disperse diamond abrasive into liquid medium by adding a dispersing agent or the like.

### According to the type of diamond:

Synthetic diamonds can be roughly classified into single crystal diamonds, polycrystalline diamonds, and nanodiamonds.

Therefore, diamond slurry (polishing liquid) can also be sorted into single crystal diamond slurry, polycrystalline diamond slurry, and nanodiamond slurry.

### According to the dispersion medium:

There are three kinds of dispersion media for diamond slurry which are widely used at present: an aqueous dispersion medium, an oil dispersion medium, and a general-purpose medium (emulsion type medium). When using, the appropriate slurry should be selected according to the specific conditions of use.

#### 1) Single crystal diamond liquid

Single crystal diamond liquid has good cutting force and relatively low processing cost.

#### 2) Polycrystalline diamond liquid



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Polycrystalline diamond fluid utilizes the good toughness of polycrystalline diamond to maintain high grinding force and scratch resistance during grinding and polishing.

### 3) Nano-diamond liquid

Nano-diamond spherical shape and fine-grained powder can achieve ultra-precision polishing effect, and have good dispersion stability, can maintain no sedimentation for a long time, and the powder does not agglomerate in the dispersion. It is widely used in the ultra-precision polishing process of hard materials to make the polished surface roughness less than 0.2nm.

